REMARKS

Claim 1 is amended to include the limitations of claim 4, which is now cancelled; claim 13 is amended to include the limitations of claim 16, which is now cancelled; claim 25 is amended to include the limitations of claim 26, which is now cancelled; claim 27 is amended to include the limitations of claim 28, which is now cancelled; and claim 29 is amended to include the limitations of claim 30, which is now cancelled. Various dependent claims are amended for purposes of correcting claim dependencies. The claim amendments are made for purposes of expediting prosecution, and Applicants reserve the right to file continuing applications as may be determined to be desirable.

Claims 1-30 are pending in the application. Reconsideration and allowance of the application are respectfully requested.

Request for information

In response to the Examiner's request for further information, Applicant has provided copies of the following items:

DeSarbo, W. S., Corn, L. W. (1988), "A Maximum Likelihood Methodology for Clusterwise Linear Regression, " J. of Classification, 5:249-282

Henning, C. (1997), "Datenanalyse mit Modellen Fur Cluster Linear Regression." Dissertation, Institut Fur Mathmatsche Stochastik, Universitat Hamburg

Henning, C. (1999): Models and Methods for Clusterwise Linear Regression in Gaul, W. and Locarek-Junge, H. (Eds.): Classification in the Information Age, Springer, Berlin, p. 179-187.

Henning, C. (2002): Fixed point clusters for linear regression: computation and comparison (Part of Preprint 2000-02) Journal of Classification 19, 249-276.

Spath, H. (1979), Algorithm 39: Clusterwise Linear Regression, Computing, 22, 367-73.

Spath, H. (1981), "Correction to Algorithm 39: Clusterwise Linear Regression," Computing, 26, 275.

Spath, H. (1982), "Algorithm 48: A Fast Algorithm for Clusterwise Linear Regression, Computing, 29, 175-181.

Torgo, L., and Pinto da Costa, J. (2000): "Clustered Partial Linear Regression," Machine Learning, 50 (3), pp. 303-319. Kluwer Academic Publishers.

Williams, J. (2000), "Fitting Regression Models to Finite Mixtures," ANZMAC Visionary Marketing for the 21st Century: Facing the Challenge, 1409-1414.

35 USC §101

The rejection of claims 1-12 as being directed to non-statutory subject matter should be withdrawn in view of the amendment to claim 1.

Objections to the Drawings

Paragraph [0030] of the specification is amended for consistency with the labels of FIG. 1. Therefore, no amendment to the drawings is thought to be necessary.

Patentability under 35 USC §103(a)

Claims 1-7, 10-12, 13-19 and 22-28 are understood to be patentable under 35 USC §103(a) over "De Smet " ("Motion-based Segmentation Using a Thresholded Merging Strategy on Watershed Segments" by De Smet et al.) in view of "Zhang" ("*K*-Harmonic Means – A Data Clustering Algorithm" by Zhang et al.). The rejection is respectfully traversed because the Office Action does not show that all the limitations are suggested by the combination and does not provide a proper motivation for modifying the teachings of De Smet with teachings of Zhang.

The De Smet-Zhang combination neither teaches nor suggests the limitations of "initializing regression functions for each of the K clusters to estimate the centers of motion for the data points; calculating the distances from each data point to each of the K regression functions; calculating a membership probability and a weighting factor for each data point based on distances between the K regression functions and each data point;" as set forth in claim 1. Independent claims 13, 25, 27, and 29 include similar limitations.

De Smet teaches using a direct K-means (KM) cluster algorithm with a minimum distance merging technique (section 2.3). As described by Zhang, KM clustering is a

center-based, iterative algorithm that refines the clusters defined by K centers. Likewise, Zhang's K-harmonic means (KHM) algorithm is also center based and refines the clusters defined by K centers (page 1, last paragraph). Zhang's KHM clustering algorithm starts with an initialization of center positions and iteratively refines these positions (page 2, second paragraph). Zhang's algorithm for the KHM performance function is said to be insensitive to this initialization of center positions (page 4, section 5). Zhang's "KHM algorithm starts with a set of initial positions of the centers ... and then the new positions of the centers are calculated ..." (page 5, third paragraph).

In contrast, the claimed invention uses "regression functions for each of the K clusters to estimate the centers of motion." As shown in FIG. 7 and described in paragraph [0049], "it is much better to find the partitions in the data and learn a separate function on each partition as shown in the graph of the three regression functions 750" as compared to the single regression function in graph 700. Thus, instead of using center positions, the present invention uses regression functions to estimate the centers of motion.

The current invention further calculates the distances from each data point to each of the K regression functions. Thus, the invention uses multiple K regression functions. In contrast, Zhang uses a single performance function, from which partial derivatives are taken with respect to the center positions (section 5, page 4). Also, since Zhang uses the distance from a data point to a center position (section 5, page 4), there is no apparent suggestion of the claimed calculated distances from each data point to each of the K regression functions. In addition, there is no apparent suggestion, nor does the Office Action cite any particular teaching of the De Smet-Zhang combination that suggests calculating a membership probability and a weighting factor for each data point based on distances between the K regression functions and each data point.

Claims 2-7, 10-12, 14-19, and 22-24 depend from the independent claims discussed above. Thus, the Office Action has not shown that the De Smet-Zhang combination suggests the limitations of these dependent claims for at least the reasons set forth above. Therefore, the rejection of claims 1-7, 10-12, 13-19, and 22-28 should be withdrawn because a *prima facie* case of obviousness has not been established.

Claims 8-9 and 20-21 are understood to be patentable under 35 USC §103(a) over the De Smet-Zhang combination as applied to claims 4 and 16 above, and further in view of "Herrmann" ("A Video Segmentation Algorithm for Hierarchical Object Representations and its Implementation" by Herrmann et al.). The rejection is respectfully traversed because the Office Action does not show that all the limitations are suggested by the combination and does not provide a proper motivation for modifying the teachings of De Smet with teachings of Zhang and Herrmann.

Claims 8 and 9 have claim 1 as a base claim, and the limitations are not shown to be suggested for at least the reasons set forth above. Therefore, the rejection should be withdrawn because a *prima facie* case of obviousness has not been established.

Claims 27-30 are understood to be patentable under 35 USC §103(a) over the De Smet-Zhang combination in view of "Reitmeier" et al. (U.S. Patent No. 6,084,912 to Reitmeier) The rejection is respectfully traversed because the Office Action does not show that all the limitations are suggested by the combination and does not provide a proper motivation for modifying the teachings of De Smet with teachings of Zhang and Reitmeier.

Claims 27 and 29 (claims 28 and 30 are cancelled) include limitations similar to those of claim 1 as discussed above. Therefore, the limitations are not shown to be suggested by the De Smet-Zhang-Reitmeier combination for at least the reasons set forth above. The rejection of claims 27 and 29 should be withdrawn because a *prima facie* case of obviousness has not been established.

Withdrawal of the rejections and reconsideration of the claims are respectfully requested in view of the remarks set forth above. No petition for an extension of time is thought to be needed. However, if any such petition is required, please consider this a petition for a sufficient extension of time to consider this response. If there are any additional fees in connection with a petition or this response, please charge Deposit Account No. 50-0996 (HPCO.145PA).

Respectfully submitted,

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